Final Report

A project under the Canada
New Brunswick Conservation
and Renewable Energy
Demonstration Program

enerplan consultants ltd.
energy planning and engineering

D.B.56

ENERGY DEMONSTRATION PROJECT

THREE RESTAURANTS

CREDA NO. 2048

By: ENERPLAN CONSULTANTS LTD.

MARCH, 1985

86 Botsford Street, Moncton, N.B. E1C 4X3 • (506) 854-5536

Canada/New Brunswick Conservation and Renewable Energy Demonstration Program

The Conservation and Renewable Energy Demonstration Program Program is administered in New Brunswick by the Energy Secretariat and managed jointly with Energy, Mines and Resources Canada. The Program is designed to help demonstrate promising conservation and renewable energy technologies, to develop public awareness and understanding of these technologies, and to create employment in new or existing industries.

Through over 100 demonstration projects in New Brunswick, a wide variety of conservation and renewable energy technologies have proven to be technically sound and economically attractive. These demonstration projects should now provide a catalyst for commercialization and lead to widespread adoption of many of these proven technologies.

This final report is based on a project which was financially supported by the Energy Demonstration Program. For further information on other demonstration projects funded in New Brunswick under this program, contact:

Conservation & Renewable
Energy Division
Energy Secretariat
P.O. Box 6000
Fredericton, N.B.
E3B 5H1
(506) 453-3897

Programme Canada/Nouveau-Brunswick de démonstration des économies d'énergie et des énergies renouvelables

Le Programme de démonstration des économies d'énergie et des énergies renouvelables est administré au Nouveau-Brunswick par le Secrétariat à l'énergie, en collaboration avec Energie, Mines et Ressources Canada. Ce programme tente d'abord de vérifier la fiabilité des techniques de conservation d'énergie, d'accroître la sensibilité du public envers ces techniques et, enfin, de favoriser la création d'emplois au sein des industries nouvelles ou déjà existantes.

Un grand nombre de projets de démonstration se sont avérés à la fois techniquement réalisables et économiquement attrayants.

Le succès ainsi rencontré encourage la commercialisation des procédés les plus accessibles. Cela entraînerait certes l'adoption d'un grand nombre de ces techniques par les propriétaires de domiciles et par l'industrie privée.

Ce rapport final est basé sur un projet qui a reçu une aide financière du Programme de démonstration. Pour de plus amples renseignements, communiquez avec la:

Division des économies d'énergie
et des énergies renouvelables
Secrétariat à l'énergie
C.P. 6000
Fredericton, N.-B.
E3B 5H1
(506) 453-3897

D I S C L A I M E R

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D E N I D E R E S P O N S A B I L I T E

Ce rapport, financé conjointment par le Secrétariat à l'énergie du Nouveau-Brunswick et Energie, Mines et Ressources Canada, est publié à titre de service public. Les gouvernements fédéral et provinciaux n'assurent aucunement l'exactitude du contenu, l'efficacité des appareils et des procédés et, enfin, les économies que préconise le rapport. L'utilisation de ces systèmes de conservation d'énergie ne doit, à aucun moment, empiéter sur les droits d'autrui.

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1.0 EXECUTIVE SUMMARY

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Kitchen hood exhaust air has traditionally been replaced with 100 percent fresh air heated to room conditions by oil or electricity. This demonstration involved the use of modern technologies to reduce the amount of outside air that must be heated and alternatively, preheating the make-up air using heat recovered from exhaust air. Two restaurants were retrofitted with push-pull type air systems where a large percentage of air is introduced directly into the hood thus avoiding heating costs. One restaurant was retrofitted with a plate type air to air heat exchanger to recover heat from the exhaust air for use in preheating make-up air.

The main objective of this demonstration was to demonstrate the feasibility of retrofitting existing restaurant kitchens with equipment to save energy. All work has been successfully completed. Economic feasibility depends on existing conditions before the retrofit. Technologies used are readily adaptable to most kitchen exhaust hoods in restaurants.

1.0 SOMMAIRE RECOMMANDATION

L'air évacué par la hotte de la cuisinière est habituellement remplacé totalement par de l'air frais qui doit être chauffé à la température de la pièce par une installation au mazout ou à l'électricité. Cette démonstration fait appel aux technologies modernes et vise à réduire la quantité d'air frais qu'il faut chauffer en réchauffant préalablement l'air d'appoint au moyen de la chaleur récupérée dans l'air évacué. Deux restaurants furent rénovés au moyen d'un système push-pull de circulation d'air en vertu duquel un grand pourcentage d'air est introduit directement dans la hotte, évitant ainsi des coûts de chauffage. Un autre restaurant fut rénové en installant un échaugeur de chaleur air-air à plaque servant à récupérer la chaleur de l'air évacué afin de réchauffer l'air d'appoint.

Le principal objectif de cette démonstration était de démontrer la faisabilité du rattrapage de la cuisine de restaurants existants avec du matériel servant à économiser l'énergie. Tous les travaux ont été exécutés avec succès. La faisabilité économique dépend des conditions existantes avant le rattrapage. Les technologies utilisées sont facilement adaptables à la plupart des hottes servant à évacuer l'air au-dessus des fournaux dans les restaurants.

2.0 INTRODUCTION

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Restaurants exist throughout the province of New Brunswick ranging in size from fast food outlets to large hospital and institutional cafeterias. Kitchen exhaust hoods are used in all facilities.

Enerplan Consultants Ltd. prepared and submitted a proposal for an energy demonstration project on three restaurants located in the province. The primary objective was to demonstrate methods of retrofitting kitchen exhaust hoods for energy conservation. The proposal was accepted by the Energy Secretariat for funding under the Conservation and Renewable Energy Development Agreement and was initiated in 1983.

Energy records from suppliers were used before and after the retrofits to monitor the effects of installation of kitchen hood equipment. Conclusions were based on energy records and tests of equipment on site.

The restaurants involved in the retrofits are Pres du Lac in Grand Falls, Burger Junction in Woodstock and China House in Fredericton. The three restaurants represent typical building structures of small restaurants. The first two are all electric facilities while the third is oil and electric. Pres du Lac and China House demonstrate push-pull air systems, while Burger Junction has a plate type heat recovery system.

3.0 DESCRIPTION OF DEMONSTRATION

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3.1 General

Kitchen exhaust hoods generally have an exhaust duct going up through the roof to an upblast exhaust fan. This fan usually runs continuously during kitchen operation to remove steam, grease fumes, gas fumes and heat. Makeup air is usually provided by a supply fan with a heating coil or air is simply pulled out of the eating area where infiltration air is used for makeup. Facilities using outside air infiltration are typically less comfortable than buildings with tempered air supply systems. Both makeup air types are expensive to operate.

3.2 Push-Pull Kitchen Air Systems

Kitchen air systems have been developed that introduce between 70 and 85 percent of outside makeup air into the hood directly for mixing with cooking vapors. The remaining 15 to 30 percent of the makeup air continues to come from the room to maintain an adequate air current for fume and odor removal. A reduction of 70 to 85 percent in tempered air results in a substantial saving.

3.0 DESCRIPTION OF DEMONSTRATION (Cont'd)

3.2 Push-Pull Kitchen Air Systems (Cont'd)

A schematic and description of operation is provided in Appendix A.

Requirements for retrofit are sufficient space for installation and approval of equipment by the Canadian Standards Association (CSA). At least 6.5 ft. should be available below the hood and the hood should extend one foot beyond the cooking surface.

3.3 Heat Recovery Equipment

Air to air plate exchangers can be installed to recover heat from exhaust air and preheat fresh air. Kitchen systems must include a washdown system to allow cleaning daily; otherwise exchanger efficiency decreases due to grease covering the plates.

Packaged heat recovery units complete with washdown are available.

A typical schematic is shown in Appendix B.

Requirements for retrofit are similar to the push-pull systems but include the need for structural support reinforcing on roof installed units.

3.0 DESCRIPTION OF DEMONSTRATION (Cont'd)

3.4 China House

China House has oil and electric space heating. The kitchen used 100 percent makeup air by infiltration with most infiltration through a roof grille in the kitchen.

An Econovent hood push-pull air system was installed here with a capacity of 6000 cubic feet per minute.

Details are available in Appendix C.

3.5 Pres du Lac

Pres du Lac has electric space heating. Total fresh air was madeup by infiltration air from the rest of the building.

An Econovent hood was installed here with a capacity of 4400 cubic feet per minute.

Details are available in Appendix D.

3.0 DESCRIPTION OF DEMONSTRATION (Cont'd)

3.6 Burger Junction

Burger Junction has three exhaust hoods in the kitchen. Exhaust air was made up mostly by infiltration although a homemade makeup air system was installed and not working properly.

A heat recovery system was installed in this restaurant with the unit located behind the restaurant on top of a cooler since the roof structure could not support the unit.

Details are available in Appendix E.

4.0 MONITORING

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4.1 General

All kitchen systems are installed and operating successfully. Operating and kitchen staff are very pleased with the systems' performance.

Problems have occurred with monitoring, however. Only China House has complete comparative years before and after the retrofit. Pres du Lac has had other renovations and growth over the monitoring period and electric meters vary between three and six in number with no way of knowing which meters are affected by the kitchen retrofit. Burger Junction retrofit was completed in December 1984 so only one month is available for comparison of energy consumption.

4.2 China House

The China House Econovent System has a Balance Report showing 73 percent of outside air is introduced into the hood unheated while makeup air requiring heating is reduced to 27 percent of that before retrofit. Balance Report is included in Appendix C.

Electricity consumption increased by 0.3 percent from 1983 to 1984. Oil decreased by 8.4 percent from 1983 to 1984. Retrofit was completed in December 1983.

4.0 MONITORING (Cont'd)

4.3 Pres du Lac

Pres du Lac Econovent System has a Balance Report showing 71 percent of outside air is introduced into the hood. Now, only 29 percent of fresh air needs heating. Balance Report is included in Appendix D.

4.4 Burger Junction

Burger Junction plate type heat exchanger has a design efficiency of 64.9 percent. Data is shown in Appendix E.

A comparison of January and February, 1985 with the same period in 1984 shows a decrease in electricity consumption of 25.5 percent.

Details on energy invoices and monthly distribution can be found in Appendix F.

5.0 PROJECT COST ACCOUNTING

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5.1 Total Project Cost and Funding

The cost breakdown for this project is listed below:

China House	$ 28,779.00
Burger Junction	$ 29,969.00
Pres du Lac	$ 32,417.45
Engineering and Management	$ 23,000.00
Performance Monitoring Information Transfer	$ 24,200.00
Final Report	$ 750.00
PROJECT TOTAL	**$141,365.45**
CREDA Funding	$108,300.00
Restaurants Contribution	
China House $10,072.65	
Burger Junction $10,489.15	
Pres du Lac $12,503.65	
	$ 33,065.45

5.0 PROJECT COST ACCOUNTING (Cont'd)

5.2 Cost Benefit Analysis

China House shows a saving of approximately $350.00 per year on oil or about 1,100 litres per year. The 8 percent saving in space heating costs is less than normally expected. It is felt that savings were less than usual because prior to retrofit makeup air was entering the kitchen through a roof grille without preheating and the kitchen area was simply kept colder than normal conditions. Although savings are less than expected an improved working environment has made the retrofit worthwhile. The balance report in appendix C shows that now 73 percent of makeup air can be introduced directly into the hood so, theoretically, air requiring heating has been reduced to 27 percent of that previous to retrofit. A calculation of the expected saving shows a theoretical decrease in operating costs of $2,950.00 per year based on 1,580 hours of operating based on 1985 oil rates. (See Appendix H).

Pres du Lac has gone from three electrical meters to six meters from January 1983 to the present. No individual meter can be used to properly represent kitchen air heating although meter 5 as shown in

5.0 PROJECT COST ACCOUNTING (Cont'd)

5.2 Cost Benefit Analysis (Cont'd)

Appendix F is now serving the kitchen area. Wiring and therefore metering has been changed around apparently since NB Power did not read the meter during some months as shown by the blank spaces. However, based on the balance report for the Econovent System, 71 percent of the makeup air is now introduced directly into the hood so now only 29 percent of makeup air needs to be heating. Theoretically this should result in a saving of approximately 122,000 kilowatt hours per year or $6,900.00/year at the 1985 electrical rates.

Burger Junction shows consumption of 94,545 kilowatt hours for the first three months of 1985 compared to 128,572 kilowatt hours for the first three months of 1984. Annual estimated savings are expected to be approximately 90,000 kilowatt hours or $5,000.00 per year based on 1985 electrical rates.

Based on three restaurants studied it appears that a single payback period between 4.3 and 9.7 years can be expected for capital investments in heat recovery from kitchen hood exhausts.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The retrofit work done on three restaurants was done very successfully. The technologies demonstrated have been shown to be readily adaptable to most existing traditional 100 percent fresh air makeup systems in kitchens.

6.2 Recommendations

As the result of this energy demonstration project we recommend the following:

1) Retrofits to Kitchen exhaust systems should be done to CSA standards using approved equipment only. 'Home-made' or 'site fabricated' systems should be accepted by the fire protection authorities before installation.

2) Maintenance is a prime requisite for proper functioning of a kitchen hood system. Staff should be completely informed about operation of equipment and trained to carry out maintenance regularly.

3) Air requirements of the facility should be considered in initial design. If cooling is required in the dining area year around, then 100 per cent makeup air heated to 55-60°F may be the better choice of system.

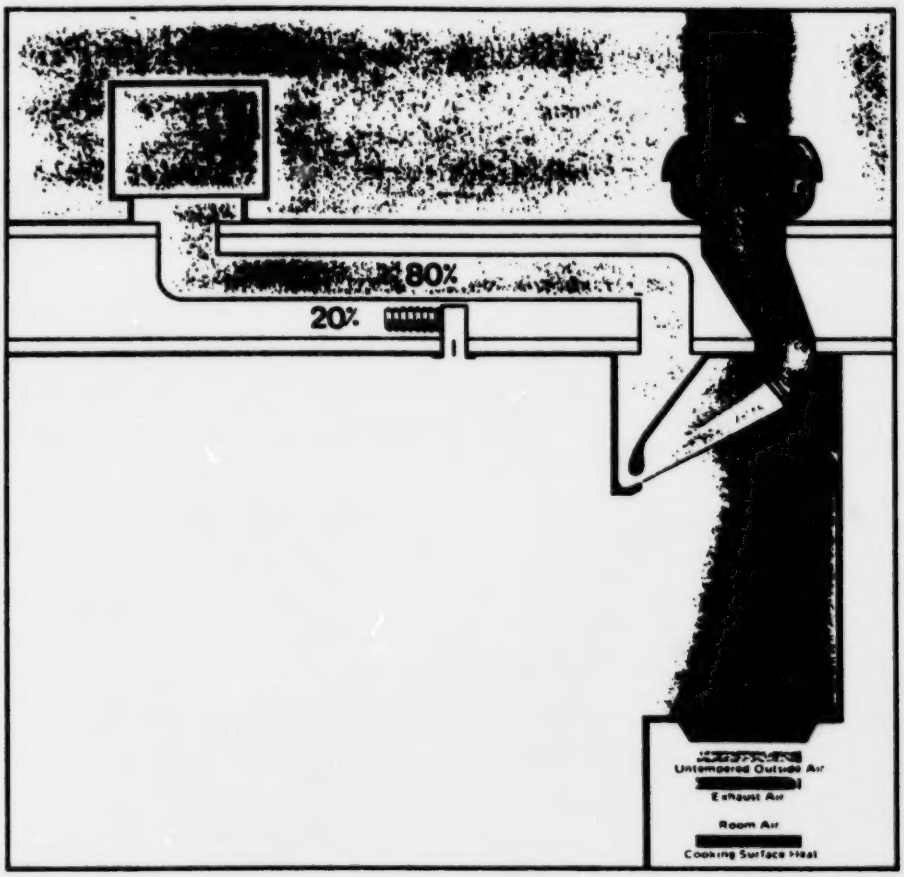
4) A detailed study should be undertaken to determine feasibility of kitchen hood retrofits in kitchens.

5) Care should be taken to allow for adequate structural support and installation space for the new proposed system.

APPENDIX A

TYPICAL PUSH-PULL KITCHEN AIR SYSTEM

Econovent PRINCIPLE OF OPERATION



A conventional exhaust system rids a kitchen of cooking vapors and odors . . . and all of the room's conditioned air at the same time; replacing that conditioned air is expensive.

The Econovent Exhaust System uses only 20% of this conditioned air for exhaust. The remaining 80% of the exhaust air requirement is made up with a filtered fan supplying unconditioned air from the OUTSIDE. This 80% is passed through a patented slot design in the front insulated chamber of the canopy. This high velocity slot creates a TRUE VENTURI effect. (When air passes through a constriction in a contained chamber, 1600 to 2000 FPM, the VELOCITY of the air INCREASES – the PRESSURE surrounding this constriction DECREASES.) In the Econovent Exhaust System the secondary air stream, 20% thru ceiling slot diffuser, efficiently captures the cooking vapors and odors and carries them to the filters. Since 80% of the exhaust air is outside air, the filter surface temperature is usually maintained below that at which grease congeals, (approx. 100° F). Consequently, the grease collects on the filter surface and not throughout duct systems, fans, and roof. An exception to this would be if peanut oil were used. It has a lower congealing temperature.

A Proven and Approved System

The Econovent Exhaust System has proven itself in over 4000 installations and is currently specified by several large fast food chains. It has National Sanitation Foundation approval (Listing No. 1113), State of Michigan – methylene chloride test approvals and is manufactured in accordance with National Fire Protective Association Bulletin 96 requirements. The following components are U.L. listed or classified: (1) Exhaust Fan (2) Vapor proof light (3) Grease extractors. All finishes are USDA approved for food service use.

A Review of Econovent System Benefits

IT ELIMINATES THE MAKE-UP AIR UNIT – A BIG AND OBVIOUS COMPETITOR PROBLEM

It greatly lowers exhaust duct temperatures and reduces fire hazards.

It reduces the utility service, eliminates wiring, piping and weight of a typical make-up air exhaust system.

It greatly reduces utility operating costs.

It now permits a comfortable, ventilated kitchen at an economical level.

It has minimal maintenance because of engineering simplicity.

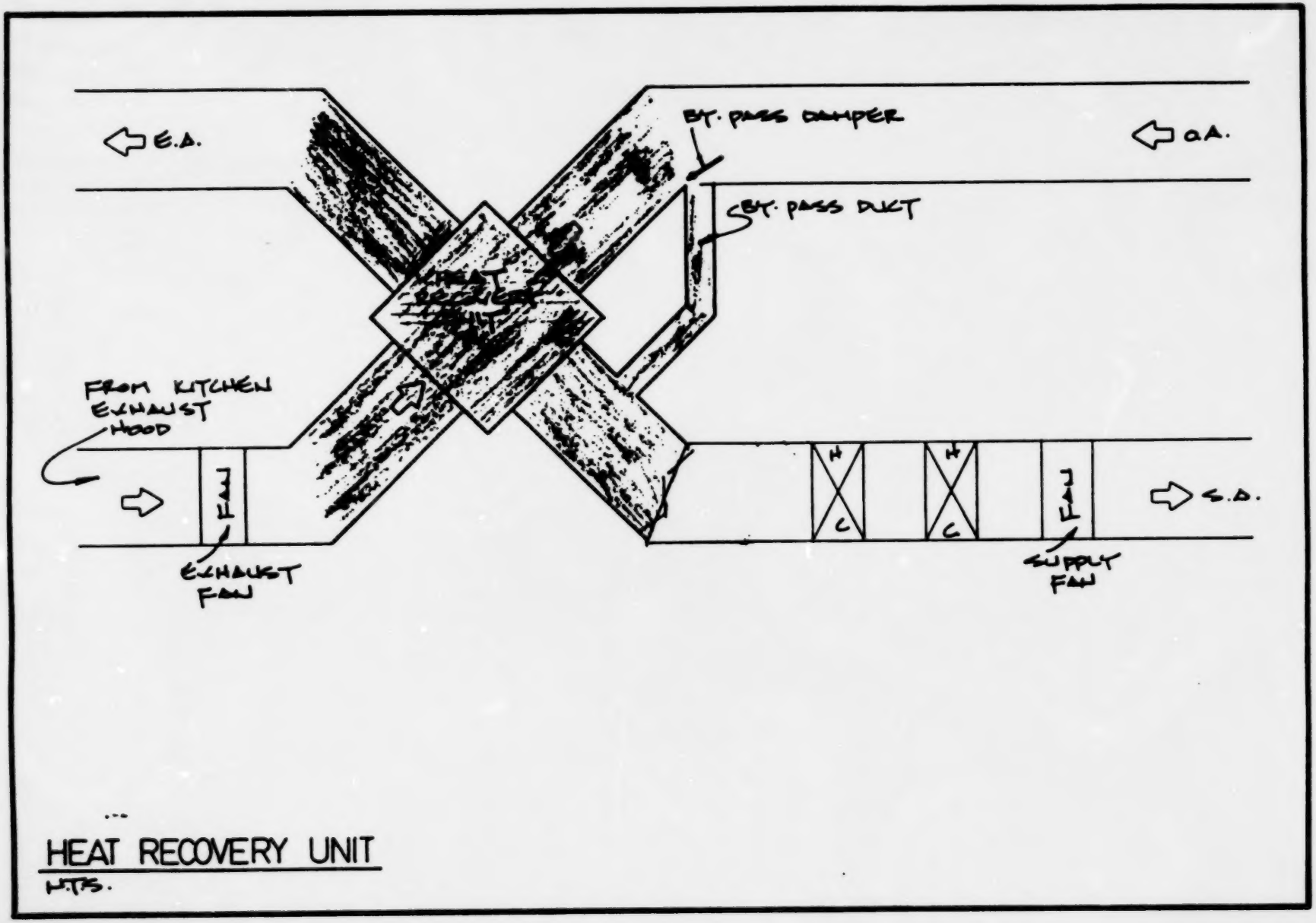
It virtually eliminates grease accumulation beyond the filter surface if simple maintenance is followed.

It greatly extends roof life normally deteriorated through heavy grease deposits.

It may allow you to have or continue to have longer business hours due to less usage of energy and, therefore, less possibility of utility cutoff.

APPENDIX B

HEAT RECOVERY UNIT SCHEMATIC



HEAT RECOVERY UNIT

N.T.S.

APPENDIX C

CHINA HOUSE RETROFIT

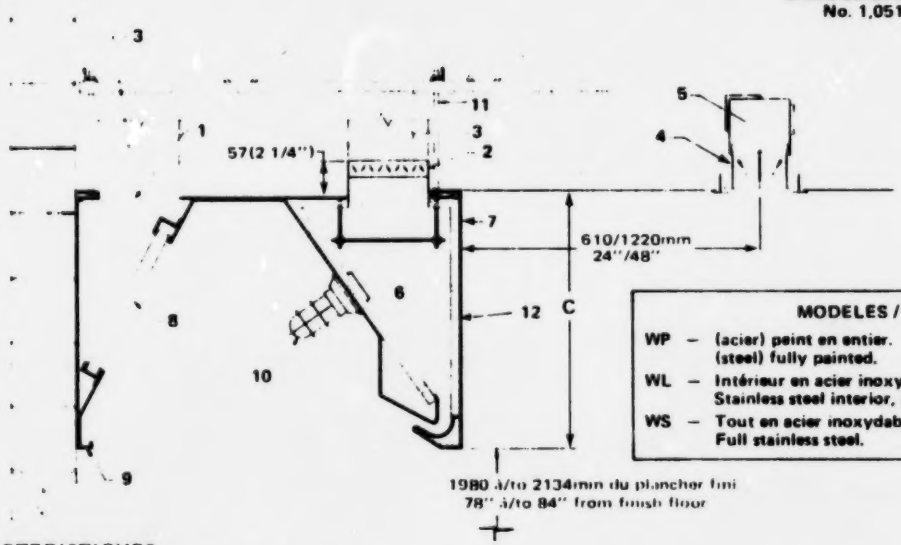
Econovent

HOTTE MURALE
WALL CANOPY HOOD

PROJ.	CHINA HOUSE RESTAURANT	ARCH.	
		ING./ENG.	CHAPLAN CONSULTANTS LTD.
		ENTR./CONTR.	M.J. BEAIRSTO CO. LTD.
PAR/BY	INDOTEC EQUIPMENT (NB) INC.	S.O.	DATE June 13, 1983

Page 1 / 2

Brevet Canadien • Canadian patent
No. 1,051,710 ; 1,069,749



MODELES / MODELS

WP – (acier) peint en entier.
(steel) fully painted.

WL – Intérieur en acier inoxydable, extérieur peint.
Stainless steel interior, polane painted steel exterior.

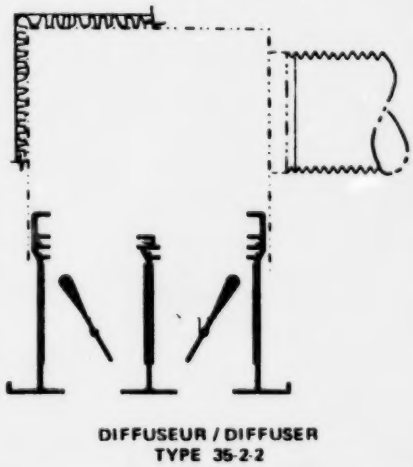
WS – Tout en acier inoxydable.
Full stainless steel.

CARACTERISTIQUES

1 – Les ouvertures d'évacuation et d'alimentation sont découpées sur le dessus de la hotte.
2 – Registres de balancement de distribution d'air fournis et installés en usine.
3 – Conduite (par d'autres).
4 – Diffuseur linéaire d'air tempéré (option).
5 – Plenum (par d'autres).
6 – Air non tempéré.
7 – Acier de calibre 16 et 18, tous les joints sont soudés.
8 – Filtres à mèches en aluminium, std. (Extracteurs opt.).
9 – Gouttière à graisse.
10 – Lampe étanche à la vapeur (CSA).
11 – Tige filetée de 13mm (1/2") dia. (par d'autres).
12 – Isolation en aluminium, 25mm (1") d'épaisseur, 1,4 kg (3 lbs) de densité, avec coupe vapeur en aluminium.

FEATURES

1 – Exhaust and supply openings are precut on top of hood.
2 – Supply air balancing dampers included and installed at factory.
3 – Duct work (by others).
4 – Tempered air linear slot diffuser (option).
5 – Plenum (by others).
6 – Untempered air.
7 – Hood all 16 and 18 ga. seam welded construction.
8 – Aluminum wire mesh filter, std. (Extractors opt.).
9 – Grease trough.
10 – Vapor proof light (CSA).
11 – 13mm (1/2") dia. threaded rod (by others).
12 – Insulation, 25mm (1") thick, 1,4 kg (3 lbs) density, with aluminum skin vapor barrier.



DIFFUSEUR / DIFFUSER
TYPE 35-2-2

FABRIQUE SOUS LICENCE PAR:
MANUFACTURED UNDER LICENSE BY:

LISI AERO-GUIDE
7747 rue Valdombre, St. Léonard, Qué. H1S 2V6 Tel. (514) 254 7533

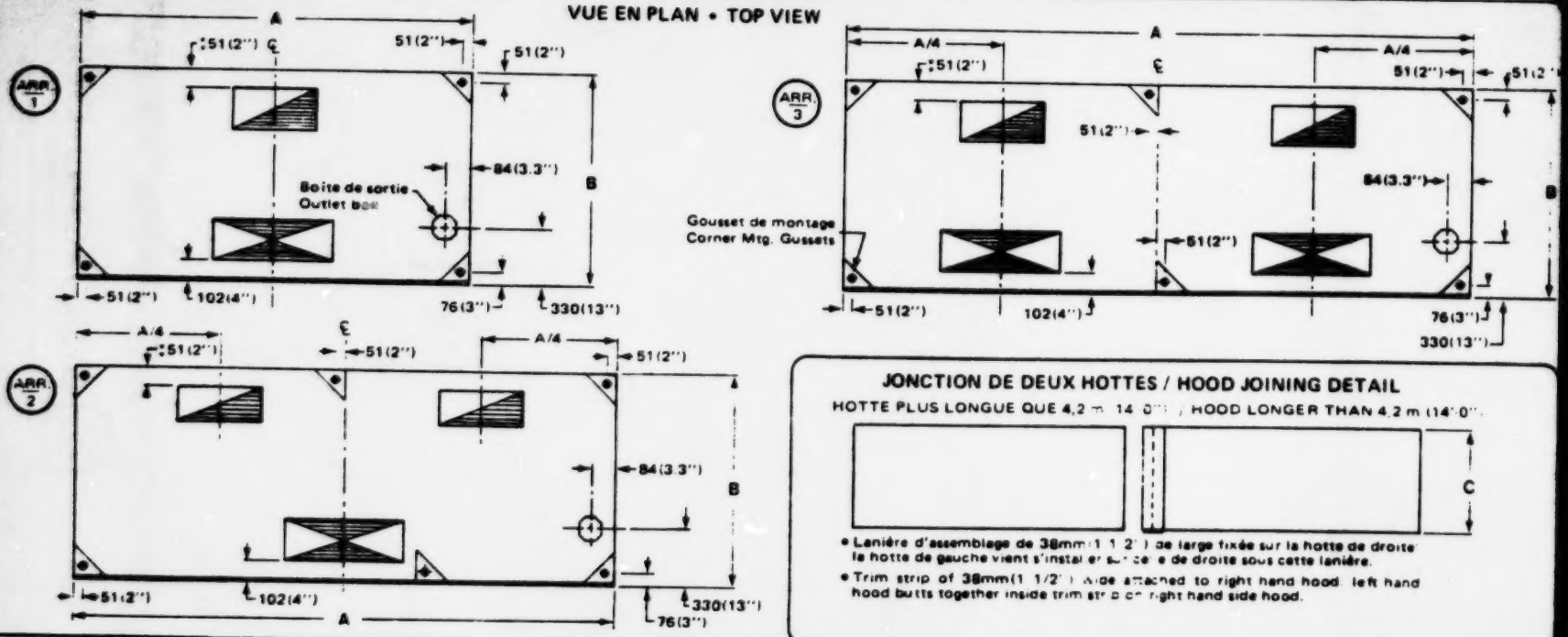
ECO-WC-100

HOTTE MURALE
WALL CANOPY HOOD

EconoVENT

LISI AERO-GUIDE

VUE EN PLAN • TOP VIEW



JONCTION DE DEUX HOTTES / HOOD JOINING DETAIL

HOTTE PLUS LONGUE QUE 4,2 m (14'-0") / HOOD LONGER THAN 4.2 m (14'-0")

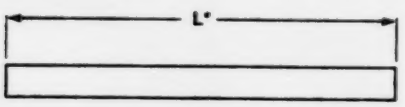
- Lanière d'assemblage de 38mm (1 1/2") de large fixée sur la hotte de droite. La hotte de gauche vient s'installer sur le côté de droite sous cette lanière.
- Trim strip of 38mm (1 1/2") wide attached to right hand hood. left hand hood butts together inside trim strip on right hand side hood.

ITEM: Qt.	Mod.	L*	No. Sect.	Sections	Dimensions A	B	C	Arr.	Ouv./Open. Alim./Supply	Qt.	Ouv./Open. Evacu./Exhaust	Qt.	Filtre/Filter M	E	Qt.	Lamp./Light INC FL	Qt	Diffuseur/Diffuser Quan.	Type	Dim.	Fini./Finish
1	WS	15'0"	2	1	7'0"	4'6"	2'6"	3	10" x 40"	1	8 x 34	1	X		4	X		1	35-2-2-0	15'0"	
				2	7'6"	4'6"	2'6"	3	10" x 40"	1	8 x 34	1	X		4	X					
				3																	
				4																	

*102mm (4") SI L'OUVERTURE D'EVACUATION EST 254mm (10") DE LARGE • 102mm (4") WITH 254mm (10") WIDE EXHAUST OPENING

M= MAILLE/MESH
E= EXTRACTEUR / EXTRACTOR AL ou/or SS

HOTTE EN SECTIONS • HOOD IN SECTIONS

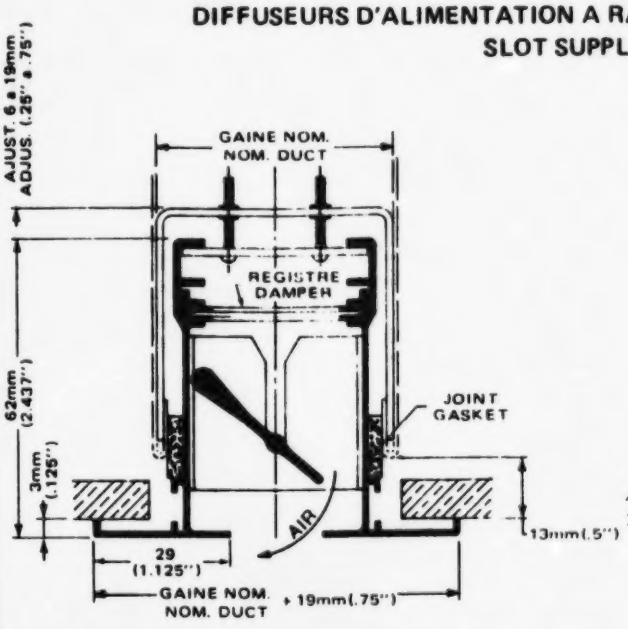


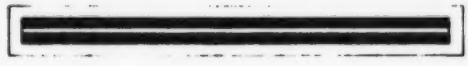
L* LONGUEUR TOTALE DE LA HOTTE
TOTAL LENGTH OF HOOD

Reference	Notes.

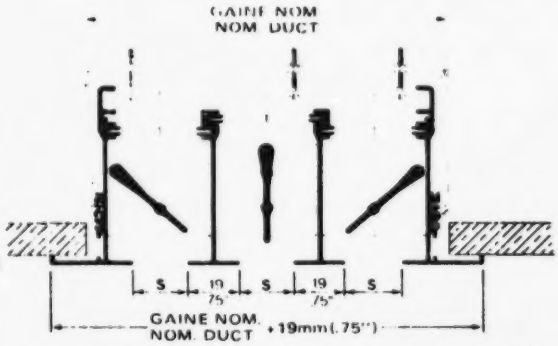
Types 35.36.37 style no. 2

DIFFUSEURS D'ALIMENTATION A RAINURES POUR INSTALLATION EN SURFACE
SLOT SUPPLY DIFFUSERS FOR SURFACE INSTALLATION





NOTE: OUVERTURE DE PLAFOND = NOM. +6mm(.25")
CEILING OPENING



1 - 35-2-2-0 - 15'0" LONG

		TYPE 35 S=25mm(1")					TYPE 36 S=19mm(.75")					TYPE 37 S=13mm(.50")				
NB. DE RAINURES / NBR. OF SLOTS		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
GAINE NOM. / NOM. DUCT	mm	64	108	152	197	241	57	95	133	171	210	51	83	114	146	178
	po	2.5	4.25	6	7.75	9.5	2.25	3.75	5.25	6.75	8.25	2	3.25	4.5	5.75	7

NOTE: Dimensions en millimètres et en pouces. / Dimensions are in millimeters and inches.

IDENTIFICATION

36 - 2 - 2 - 0

TYPE — [1] [2] [3]

[1] NOMBRE DE RAINURES / NUMBER OF SLOTS

[2] STYLE: MONTAGE CACHÉ / CONCEALED FASTENER

[3] REGISTRE / DAMPER (OPT.)

CARACTERISTIQUES

- CONSTRUCTION EN PROFILÉ D'ALUMINIUM.
- LAMES AJUSTABLES.

FINI

- FACES APPARENTES: GRIS ALUMINIUM.
- LAMES AJUSTABLES: NOIR MAT.

FEATURES

- CONSTRUCTION IN EXTRUDED ALUMINUM.
- ADJUSTABLE BLADES.

FINISH

- EXPOSED FACES: GRAY ALUMINUM
- ADJUSTABLE BLADES: DULL BLACK.

LONGUEUR MAXIMALE FABRIQUÉE D'UNE SEULE SECTION 2438mm(96")/ MAXIMUM LENGTH MADE IN ONE SECTION 2438mm(96")

PROJ. CHINA HOUSE RESTAURANT

ARCH.

ING./ENG. ENERPLAN CONSULTANTS LTD.

ENTR./CONTR. W.J. BEAIRSTD CO. LTD.

PAR/BY INDOTEC EQUIPMENT (N.B.) LTD.

DATE June 13th, 1983.

LISI AERO-GUIDE INC.
2232 Valleyfield St. Lasalle, Montreal, Que. H8S 2V6
Tel: (514) 364-2003 TELEX 05 823738

DIFFUSEURS D'ALIMENTATION
*****
SUPPLY DIFFUSERS

REV.

DATE 02-82

NO. S-36-2A

lisi aero-guide inc.

VENTILATEUR D'ALIMENTATION
SUPPLY FAN

ECONOVENT

PROJ CHINA HOUSE RESTAURANT

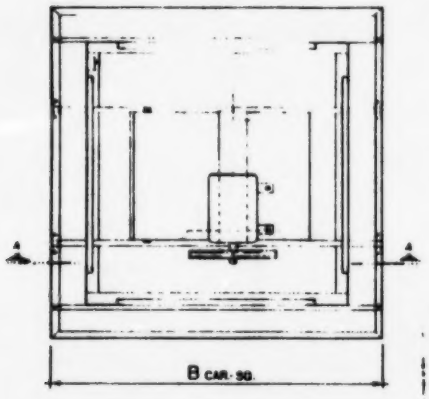
ARCH.

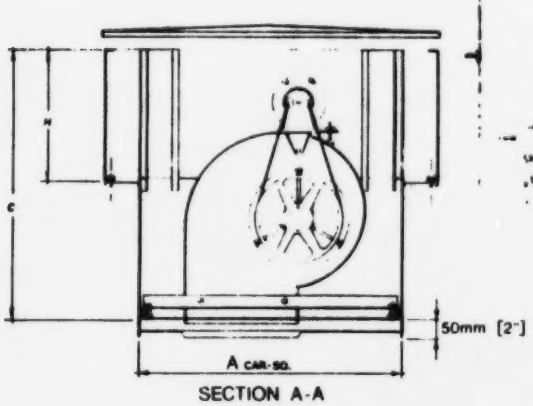
ING.-ENG. ENERPLAN CONSULTANTS LTD.

ENTR.-CONTR. W.J. BEAIRSTO CO. LTD.

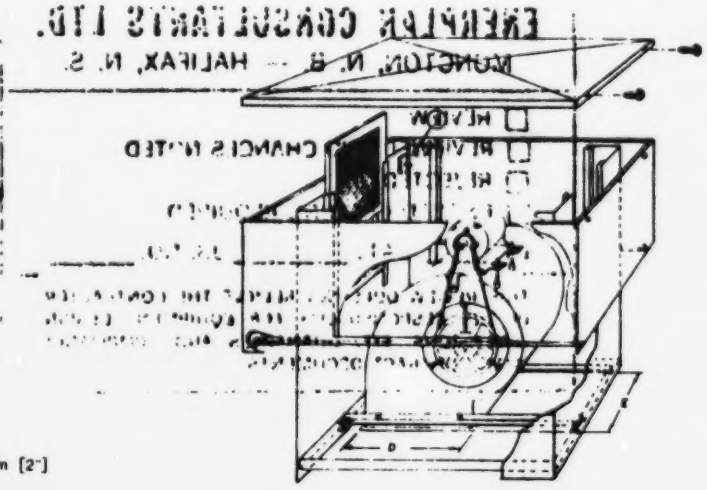
PAR-BY INDOTEC EQUIPMENT (N.B.) LTD.

DATE June 13th, 1983.





SECTION A-A



① Interrupteur de sureté - Safety switch

DIMENSIONS D'ENCOMBREMENT
PHYSICAL DATA

modèle model	A		B		C		D		E		BASE ROOF CURB		OUVERTURE DU TOIT ROOF OPENING		DIM. DES FILTRES FILTER SIZE	
	mm	po	mm	po.	mm	po.	mm	po.	mm	po.	mm	po.	mm	po.	mm	po.
AS-10	721	28 3/8"	978	38 1/2 "	762	30"	289	11 3/8 "	333	13 1/8"	686 X 686	27" X 27"	521 X 521	20 1/2" X 20 1/2"	4-305 X 610	12" X 24"
AS-12	822	32 3/8"	1083	42 5/8 "	841	33 1/8"	341	13 7/16"	397	15 5/8"	787 X 787	31" X 31"	622 X 622	24 1/2" X 24 1/2"	4-406 X 635	16" X 25"
AS-15	822	32 3/8"	1083	42 5/8 "	841	33 1/8"	403	15 7/8 "	473	18 5/8"	787 X 787	31" X 31"	622 X 622	24 1/2" X 24 1/2"	4-406 X 635	16" X 25"
AS-18	924	36 3/8"	1227	48 5/16"	1022	40 1/4"	479	18 7/8 "	556	21 7/8"	889 X 889	35" X 35"	749 X 749	29 1/2" X 29 1/2"	4-508 X 635	20" X 25"

ACCESSOIRE - ACCESSORY

VM Volet motorisé sur alimentation normalement fermé dimensions du volet même que l'ouverture du toit - 13mm [1/2"]
Motorized damper on supply normally close, damper size same as roof opening - 13mm [1/2"]

SPECIFICATION		VENTILATEUR - FAN				MOTEUR - MOTOR			ACCESSOIRES ACCESSORIES
REFERENCE	QUAN.	MODELE - MODEL	DEBIT - FLOW	PS - SP	RPM	kW/HP	COURANT - CURRENT	TYPE	
	1	CAS18L	~~5600~~ Corrigé 5200	1/2"	590	2	230/1/60		VM

Fabriquer selon moteur fourni par l'entrepreneur. Voir devis

ECONOVENT SYSTEM
CHECK-TEST-BALANCE REPORT

Date: 15/02/84

Reference No. LISI AERO-GUIDE INC.: 51903

Project: CHINA HOUSE RESTAURANT
Address: FREDERICTON, N.B.

Contractor: W.J. BEAIRSTO CO. LTD Order No.: 4591
Address: 700, McLeod Ave., Fredericton, N.B.

Owner: CHINA HOUSE RESTAURANT
Address:

Hood or System No.: 1

Hood Type: WS Size: 15' x 4'6" x 2'6"

Heated Air by: LAG: SUPPLY Others: X

Supply Fan: CAS18L
Voltage: 230/1/60 Rotation: x
Fan RPM: 1800
Adjusted, aligned and balanced: x
Protected: x
Belt tension: x

Exhaust Fan: CARNE
Voltage: 230/3/60 Rotation: x
Fan RPM: 1800
Adjusted, aligned and balanced: x
Protected: x
Belt tension: x

Supply Air Diffuser: Adjusted: YES Balanced: YES

Venturi: Balanced: YES Exhaust: Balanced: YES

General Appearance: GOOD

Comments on installation and operation:

THERE WAS NO AIR AT THE CEILING DIFFUSER WHEN WE WERE THERE.

This certifies that has checked the installation of the Econovent System and balanced the equipment for a satisfactory condition.

TECHNICIAN SIGNATURE

The completion of the check and balance has met with my approval and the Econovent System is operating satisfactorily.

STORE SUPERVISOR

Time in:
Time out:

LAG

WORK SHEET

EXHAUST

Average velocity X net filter area = design exhaust CFM

275 FPM x 19.6 SQ FT. = 5390 CFM

SUPPLY

Average velocity X net nozzle area = total supply CFM

1650 FPM x 2.38 SQ FT. = 3940 CFM

SLOT DIFFUSER

Average velocity X net slot area = total slot CFM

N/A x N/A = N/A

Total supply CFM ÷ design exhaust CFM = % supply air

3940 CFM ÷ 5390 CFM = 73%

100 − % supply air = % make-up air

100 − 73% = 27%

$$\frac{\%\text{ supply air}}{\%\text{ make-up air}} = \text{Ratio} = \frac{73}{27}$$

RECOMMENDED EQUIPMENT

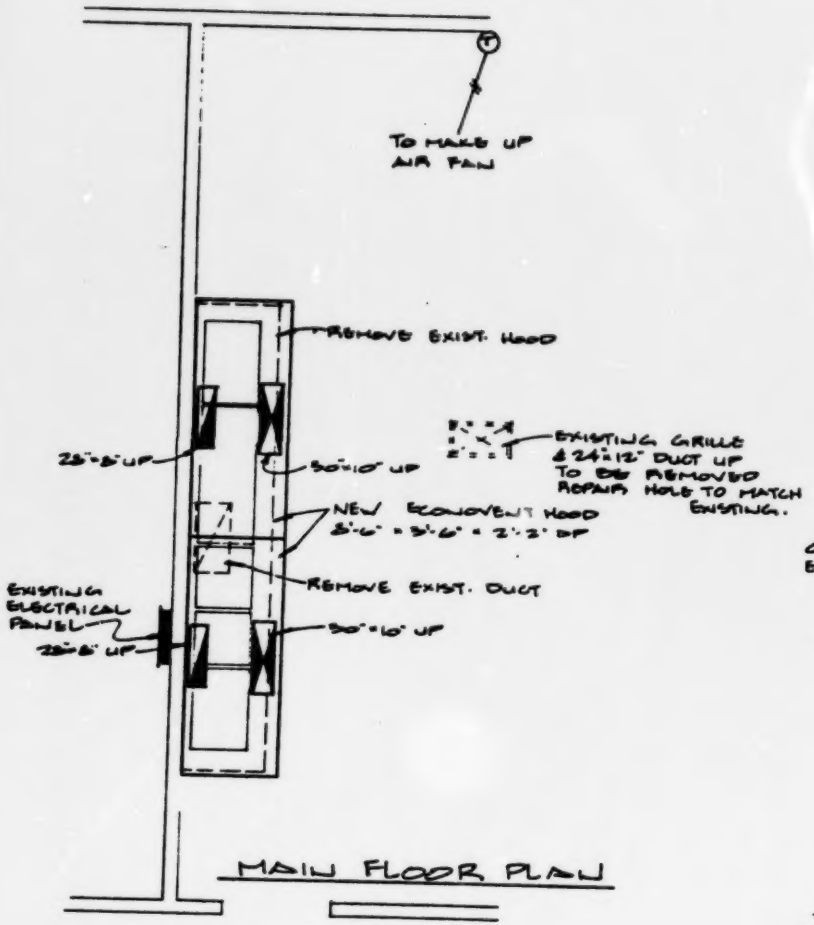
1. Alnor velometer Junior Type 8100
   0-2500 FPM
   Alnor Company, Niles, IL
2. Ventilation Smoke Tube &
   Bulb Aspirator
   Mine Safety Appliances Company
   Pittsburg, PA
3. Tachometer
4. Various hand tools

APPENDIX D

PRES DU LAC RETROFIT

PRES-DU-LAC MOTEL GRAND FALLS, NEW BRUNSWICK

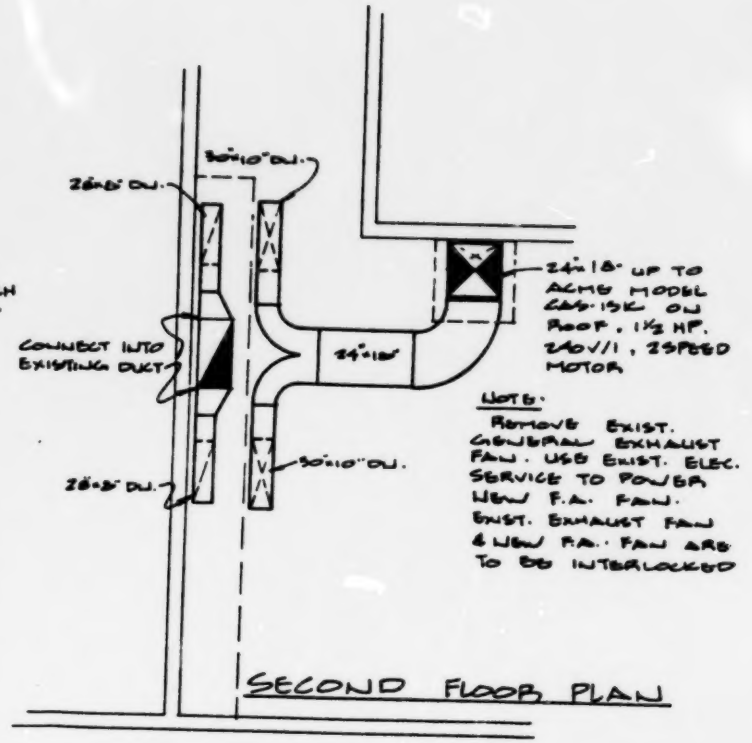
VENTILATION MODIFICATIONS MAIN & SECOND FLOORS


TO MAKE UP AIR FAN
REMOVE EXIST. HOOD
EXISTING GRILLE & 24"x12" DUCT UP TO BE REMOVED REPAIR HOLE TO MATCH EXISTING.
25'-8" UP
30'-10" UP
NEW ECONOVENT HOOD 3'-6" x 3'-6" x 2'-2" DP
REMOVE EXIST. DUCT
EXISTING ELECTRICAL PANEL
25'-8" UP
30'-10" UP

MAIN FLOOR PLAN

OPERATING SEQUENCE

WHEN MAIN EXHAUST FAN STARTS MAKE UP AIR FAN STARTS ON HIGH SPEED. SHOULD KITCHEN AIR RISE ABOVE 80°F MAKE UP AIR FAN GOES TO LOW SPEED. SHOULD KITCHEN TEMPERATURE RISE ABOVE 82°F AND OUTSIDE TEMPERATURE ABOVE 60°F MAKE UP AIR FAN SHALL SHUT DOWN ENTIRELY.



SECOND FLOOR PLAN

NOTES:

REMOVE EXIST. GENERAL EXHAUST FAN. USE EXIST. ELEC. SERVICE TO POWER NEW F.A. FAN.

EXIST. EXHAUST FAN & NEW F.A. FAN ARE TO BE INTERLOCKED

ECO..OVENT SYSTEM
CHECK-TEST-BALANCE REPORT

Date: 16/02/84

Reference No. LISI AERO-GUIDE INC.: 53272

Project: MOTEL PRES DU LAC
Address: GRAND FALLS N.B.

Contractor: P.S.L. SERVICES LTD Order No.:
Address:

Owner: MOTEL PRES DU LAC
Address: GRAND FALLS, N.B.

Hood or System No.: 1

Hood Type: WS Size: 17' x 3'6" x 2'2"

Heated Air by: LAG: SUPPLY Others: EXHAUST

Supply Fan: CA515K
Voltage: 230/1/60 Rotation: x
Fan RPM: 1800 x
Adjusted, aligned and balanced: x
Protected: x
Belt tension: x

Exhaust Fan: DAYTON
Voltage: 230/1/60 Rotation: x
Fan RPM: 1725
Adjusted, aligned and balanced: x
Protected: x
Belt tension: x

Supply Air Diffuser: Adjusted: N/A Balanced: N/A

Venturi: Balanced: YES Exhaust: Balanced: YES

General Appearance: GOOD

Comments on installation and operation:

VERY GOOD

This certifies that has checked the installation of the Econovent System and balanced the equipment for a satisfactory condition.

TECHNICIAN SIGNATURE

The completion of the check and balance has met with my approval and the Econovent System is operating satisfactorily.

STORE SUPERVISOR

Time in:
Time out:

WORK SHEET

EXHAUST

Average velocity X net filter area = design exhaust CFM

252 FPM x 17.4 SQ FT = 4393 CFM

SUPPLY

Average velocity X net nozzle area = total supply CFM

1150 FPM x N/A = N/A

SLOT DIFFUSER

Average velocity X net slot area = total slot CFM

N/A x N/A = N/A

Total supply CFM ÷ design exhaust CFM = % supply air

3128 ÷ 4393 = 71%

100 − % supply air = % make-up air

100 − 71% = 29%

$$\frac{\text{\% supply air}}{\text{\% make-up air}} = \text{Ratio} = \frac{71\%}{29\%}$$

RECOMMENDED EQUIPMENT

1. Alnor velometer Junior Type 8100
   0-2500 FPM
   Alnor Company, Niles, IL
2. Ventilation Smoke Tube &
   Bulb Aspirator
   Mine Safety Appliances Company
   Pittsburg, PA
3. Tachometer
4. Various hand tools

APPENDIX E

BURGER JUNCTION RETROFIT

INDUSCO Offer N. 1 Date 08.01.84 Page 1

Messrs E W CLOWATER

We offer:

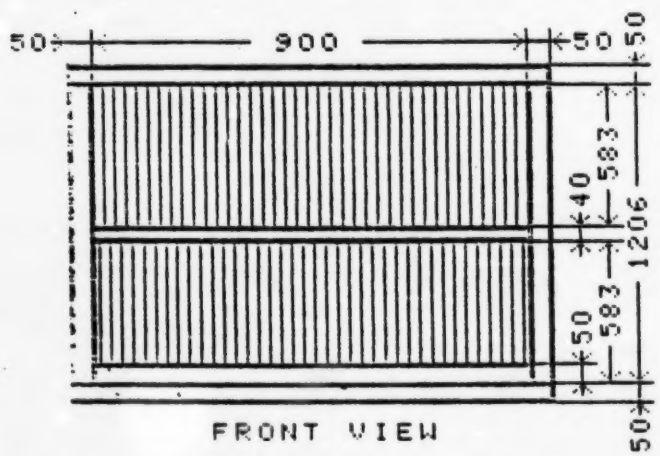
N. 1 Heat recovery unit HRH 078

WASH SYSTEM

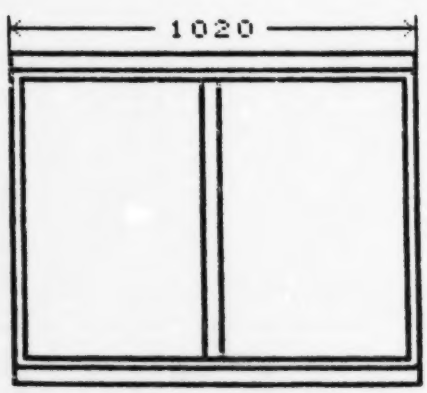
Performances in the period: Winter design

Efficiency 64.9 % Recovery BTU/h 257,450

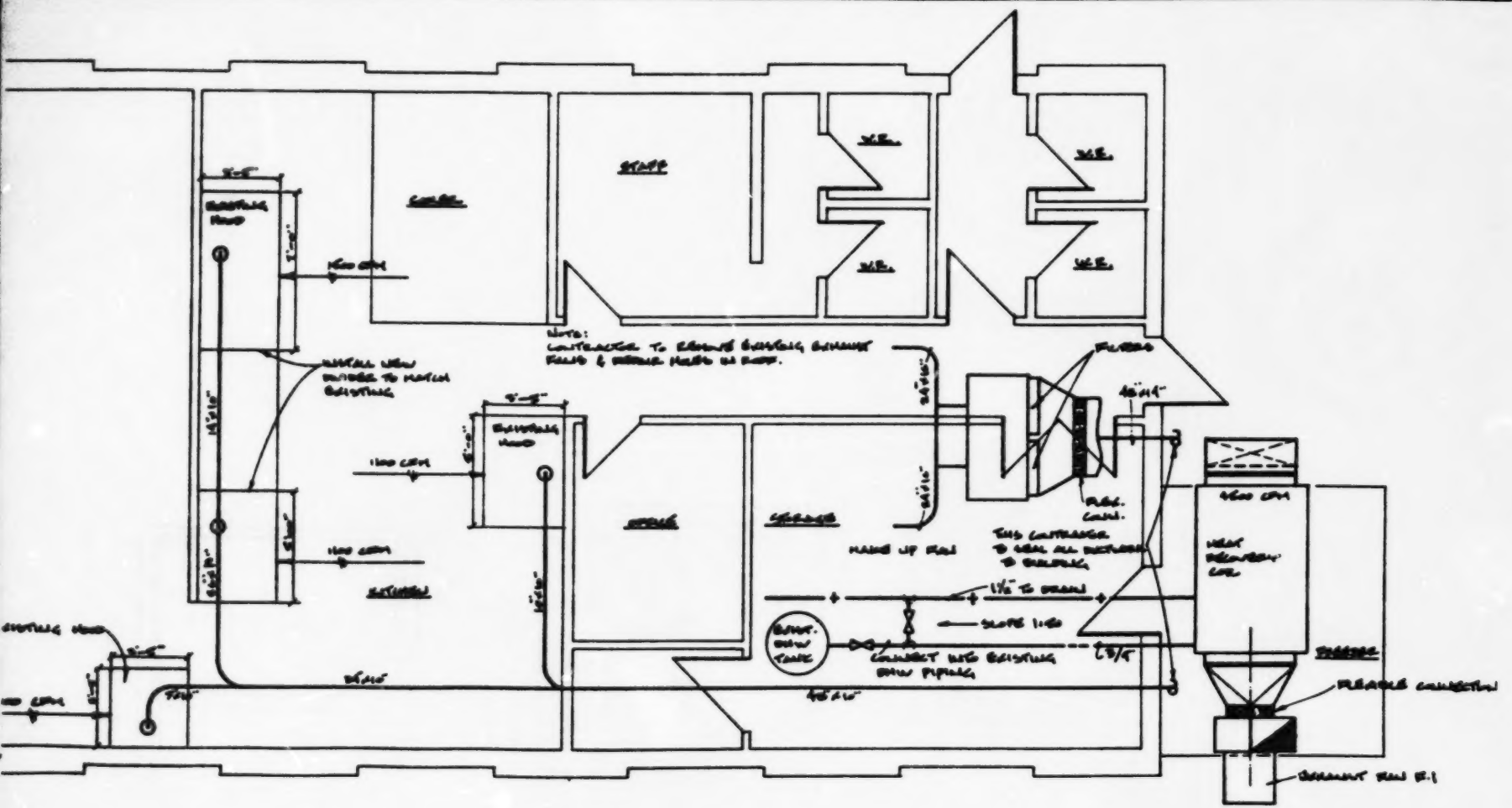
Supply:	Q1	Air volume	cfm	4,500	Q1	lbs/m	344
	T1'	Temperature: inlet		0.0	T1"	outlet	51.9
	dP1'	Pressure drop	"WG	1.20	V1	Velocity fpm	772.3
Exhaust:	Q2	Air volume	cfm	4,500	Q2	lbs/m	344
	T2'	Temperature: inlet		80.0	T2"	outlet	28.0
	UR2'	Rel. humidity: not considered					
	dP2	Pressure drop	"WG	1.27	V2	Velocity fpm	772.3



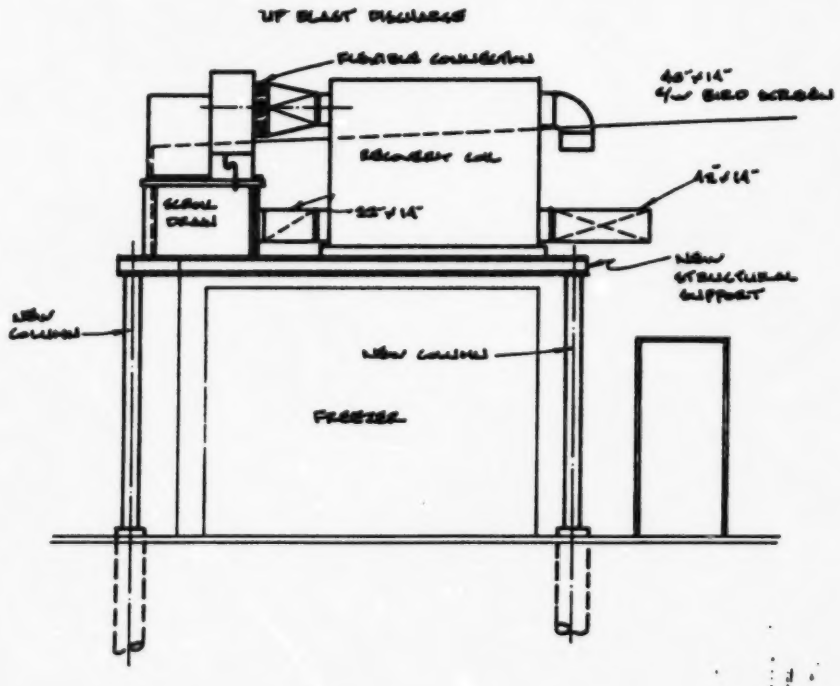
FRONT VIEW



SIDE VIEW



BURGER JUNCTION EXHAUST HEAT RECOVERY SYSTEM



ELEVATION

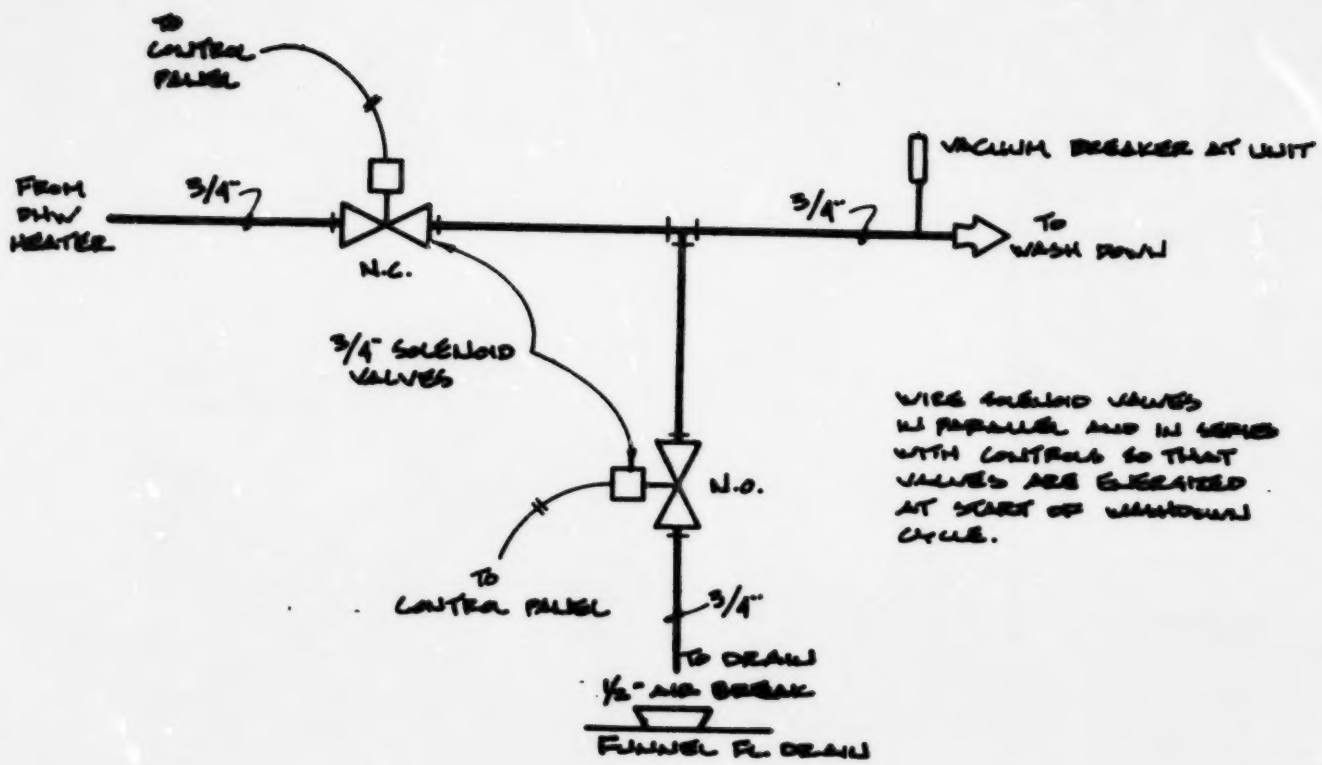
1/4" = 1'-0"

NOTES

1. F1 - DELHI BI-RM-22, C/W 5 H.P. Motor & Drive Kit, 208V/3.
2. F2 - DELHI 215-2, C/W 2 H.P. 208V/3 Motor and Drive. Cabinet to be insulated.
3. HRU - IDuct Model 75M4A, C/W Waterwash System and Controls. Unit to be suitable for use outdoors. Intake to have 30% efficient air filters.
4. Exhaust ductwork to be welded. all flanges to be gasketed at bolted joints. All metal to be 16 G.A. mild steel or 18 G.A. stainless steel. All ductwork to be insulated.
5. Fan F1 & F2 to be interlocked to run together and interlocked with waterwash control so that fans shut down during washdown.
6. All electrical power & control wiring by this contractor.
7. All structural supports for heat recovery equipment by this contractor.

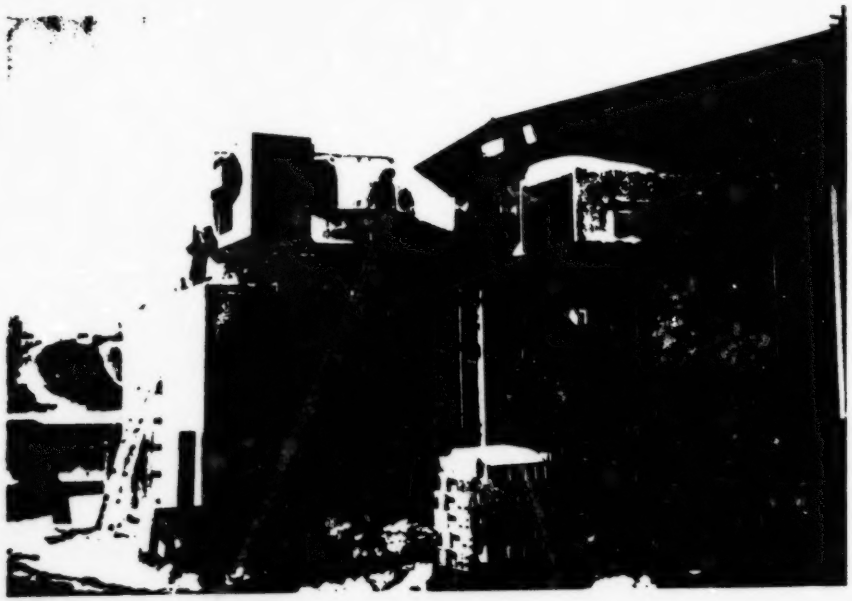
No.	Date	Remarks
		Burger Junction

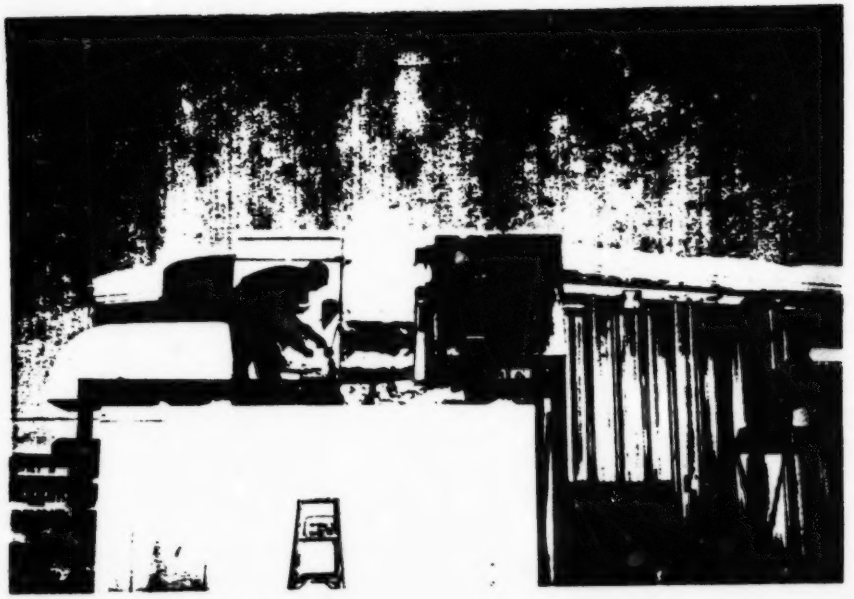
REVISIONS

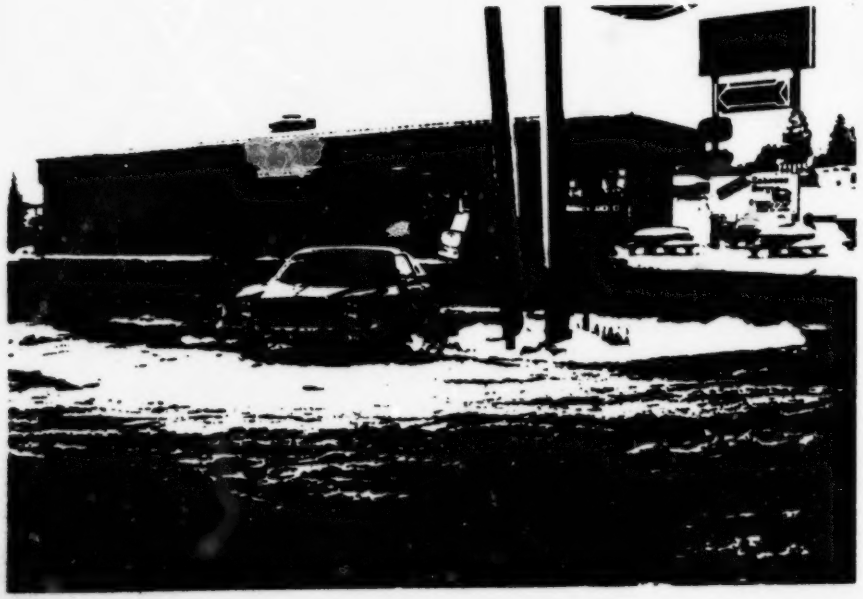


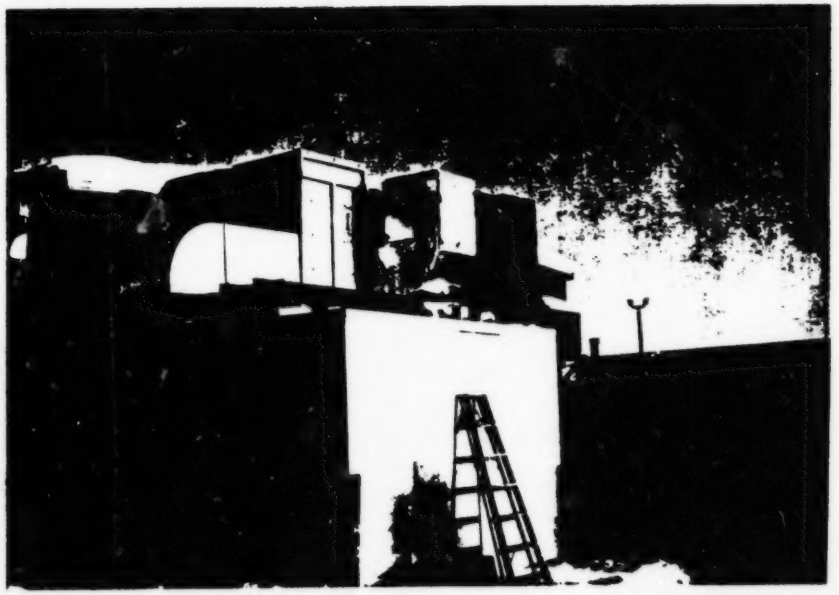
WASH DOWN PIPING DETAIL

N.T.S.









APPENDIX F

INVOICES AND MONTHLY DISTRIBUTION

PRES DU LAC

DATES FROM	TO	METER 1 X1	METER 2 X40	METER 3 X80	METER 4 X1	METER 5 X80	METER 6 X80
82 11 30	82 12 31	881	19200	28000			
82 12 31	83 01 31	1075	22280	29280			
83 01 31	83 02 28	1087	22160	28960			
83 02 28	83 03 31	1041	22120	26320	13532	16080	29440
83 03 31	83 04 30	741	11440	17200	8959	13200	18800
83 04 30	83 05 31	590	8360	14720	7003	15280	13200
83 05 31	83 06 30	748	6520	13440	3529	14240	11120
83 06 30	83 07 31	1215	6520	15920	3500	15440	11120
83 07 31	83 08 31						
83 08 31	83 09 30	856	6520	11840			
83 09 30	83 10 31	767	9440	13360			
83 10 31	83 11 30	1445	15880	21840			
83 11 30	83 12 31	1854	20040	30240			
83 12 31	84 01 31	2399	26080	38080		18880	63600

. . ./2

PRES DU LAC (Cont'd)

DATES TO	DATES FROM	METER 1 X1	METER 2 X40	METER 3 X30	METER 4 X1	METER 5 X80	METER 6 X80
84 01 31	84 02 29	1655	16040	24080	2472	15120	25520
84 02 29	84 03 31						
84 03 31	84 04 30						
84 04 30	84 05 31	777	8080	15360	4654	16400	13840
84 05 31	84 06 30	865	6400	14400	3371	14320	9440
84 06 30	84 07 31	1392	8840	32080	3342	17520	13840
84 07 31	84 08 31	1383	8160	26560	2933	16240	13760
84 08 31	84 09 30	581	7520	21440	3527	15920	12160
84 09 30	84 10 31	522	10400	23440	5601	16960	15840
84 10 31	84 11 30	706	14480	25200	7439	23360	18800
84 11 30	84 12 31	695	17720	25520	12471	26560	30400
84 12 31	85 01 31	3178	30320	28480	19285	48640	49840

ELECTRICITY LISTING OF INVOICES Printed: 03/14/85

PROJECT: 85993 PRES DU LAC

INVOICES FROM (YYMMDD)	/ TO (YYMMDD)	(DAYS)	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %
82/11/30	82/12/31	(31)	0.0	----	48,081	0.0
82/12/31	83/01/31	(31)	0.0	----	105,754	0.0
83/01/31	83/02/28	(28)	0.0	----	117,253	0.0
83/02/28	83/03/31	(31)	0.0	----	108,533	0.0
83/03/31	83/04/30	(30)	0.0	----	70,340	0.0
83/04/30	83/05/31	(31)	0.0	----	54,153	0.0
83/05/31	83/06/30	(30)	0.0	----	49,597	0.0
83/06/30	83/07/31	(31)	0.0	----	53,715	0.0
83/07/31	83/08/31	(31)	0.0	----	50,000	0.0
83/08/31	83/09/30	(30)	0.0	----	46,673	0.0
83/09/30	83/10/31	(31)	0.0	----	55,609	0.0
83/10/31	83/11/30	(30)	0.0	----	91,370	0.0
83/11/30	83/12/31	(31)	0.0	----	90,118	0.0
83/12/31	84/01/31	(31)	0.0	----	149,039	0.0
84/01/31	84/02/29	(29)	0.0	----	84,887	0.0
84/02/29	84/03/31	(30)	0.0	----	107,942	0.0
84/03/31	84/04/30	(30)	0.0	----	67,470	0.0
84/04/30	84/05/31	(31)	0.0	----	59,111	0.0
84/05/31	84/06/30	(30)	0.0	----	48,796	0.0
84/06/30	84/07/31	(31)	0.0	----	77,014	0.0
84/07/31	84/08/31	(31)	0.0	----	69,036	0.0
84/08/31	84/09/30	(30)	0.0	----	61,148	0.0
84/09/30	84/10/31	(31)	0.0	----	72,763	0.0
84/10/31	84/11/30	(30)	0.0	----	89,985	0.0
84/11/30	84/12/31	(31)	0.0	----	113,366	0.0
84/12/31	85/01/31	(31)	0.0	----	179,743	0.0
					2,124,496	

MONTHLY ELECTRICITY CONSUMPTION

Printed: 03/04/85

PROJECT :85993 PRES DU LAC

YEAR: 1982

MONTH	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %	HEATING D-DAYS (18 C)	COOLING D-DAYS (13 C)
JANUARY	.0	----	0	0.0	966.0	0.0
FEBRUARY	.0	----	0	0.0	777.0	0.0
MARCH	.0	----	0	0.0	653.0	0.0
APRIL	.0	----	0	0.0	437.0	0.0
MAY	.0	----	0	0.0	228.0	0.0
JUNE	.0	----	0	0.0	84.0	0.0
JULY	.0	----	0	0.0	24.0	0.0
AUGUST	.0	----	0	0.0	73.0	0.0
SEPTEMBER	.0	----	0	0.0	126.0	0.0
OCTOBER	.0	----	0	0.0	403.0	0.0
NOVEMBER	.0	----	0	0.0	464.0	0.0
DECEMBER	.0	----	48,081	0.0	639.0	0.0
			48,081		4894.0	0.0

MONTHLY ELECTRICITY CONSUMPTION Printed: 03/04/85

PROJECT :85993 PRES DU LAC

YEAR: 1983

MONTH	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %	HEATING D-DAYS (18 C)	COOLING D-DAYS (13 C)
JANUARY	.0	----	105,754	0.0	784.0	0.0
FEBRUARY	.0	----	115,254	0.0	707.0	0.0
MARCH	.0	----	108,534	0.0	572.0	0.0
APRIL	.0	----	70,341	0.0	373.0	0.0
MAY	.0	----	59,154	0.0	236.0	0.0
JUNE	.0	----	49,596	0.0	61.0	0.0
JULY	.0	----	53,714	0.0	16.0	0.0
AUGUST	.0	----	50,000	0.0	34.7	0.0
SEPTEMBER	.0	----	46,674	0.0	112.0	0.0
OCTOBER	.0	----	55,608	0.0	321.9	0.0
NOVEMBER	.0	----	91,371	0.0	472.0	0.0
DECEMBER	.0	----	90,117	0.0	759.8	0.0
			896,116		4449.4	0.0

MONTHLY ELECTRICITY CONSUMPTION

Printed: 03/04/85

PROJECT :85993 PRES DU LAC

YEAR: 1984

MONTH	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %	HEATING D-DAYS (18 C)	COOLING D-DAYS (13 C)
JANUARY	.0	----	149,039	0.0	894.8	0.0
FEBRUARY	.0	----	84,886	0.0	618.7	0.0
MARCH	.0	----	107,942	0.0	717.1	0.0
APRIL	.0	----	67,470	0.0	417.8	0.0
MAY	.0	----	59,111	0.0	222.2	0.0
JUNE	.0	----	48,795	0.0	89.2	0.0
JULY	.0	----	77,013	0.0	8.1	0.0
AUGUST	.0	----	69,037	0.0	14.0	0.0
SEPTEMBER	.0	----	61,149	0.0	172.2	0.0
OCTOBER	.0	----	72,763	0.0	323.5	0.0
NOVEMBER	.0	----	89,985	0.0	463.8	0.0
DECEMBER	.0	----	113,367	0.0		0.0
			1,000,557			0.0

ELECTRICITY LISTING OF INVOICES Printed: 03/14/85

PROJECT: 85995 BURGER JUNCTION

INVOICES FROM (YYMMDD)	/ TO (YYMMDD)	(DAYS)	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %
82/11/24	82/12/28	(34)	0.0	----	46,960	0.0
82/12/28	83/01/31	(34)	0.0	----	50,160	0.0
83/01/31	83/02/23	(23)	0.0	----	32,560	0.0
83/02/23	83/03/25	(30)	0.0	----	34,160	0.0
83/03/25	83/04/26	(32)	0.0	----	29,120	0.0
83/04/26	83/05/27	(31)	0.0	----	21,440	0.0
83/05/27	83/06/23	(27)	0.0	----	19,040	0.0
83/06/23	83/07/26	(33)	0.0	----	22,080	0.0
83/07/26	83/08/24	(29)	0.0	----	21,920	0.0
83/08/24	83/09/27	(34)	0.0	----	23,440	0.0
83/09/27	83/10/25	(28)	0.0	----	21,200	0.0
83/10/25	83/11/25	(31)	0.0	----	35,760	0.0
83/11/25	83/12/30	(35)	0.0	----	43,920	0.0
83/12/30	84/01/27	(28)	0.0	----	41,840	0.0
84/01/27	84/02/27	(31)	0.0	----	43,280	0.0
84/02/27	84/03/28	(30)	0.0	----	42,000	0.0
84/03/28	84/04/26	(29)	0.0	----	28,480	0.0
84/04/26	84/05/25	(29)	0.0	----	22,800	0.0
84/05/25	84/06/27	(33)	0.0	----	26,400	0.0
84/06/27	84/07/26	(29)	0.0	----	22,400	0.0
84/07/26	84/09/07	(43)	0.0	----	27,200	0.0
84/09/07	84/09/26	(19)	0.0	----	19,840	0.0
84/09/26	84/10/30	(34)	0.0	----	28,480	0.0
84/10/30	84/11/28	(29)	0.0	----	32,160	0.0
84/11/28	84/12/27	(29)	0.0	----	37,040	0.0
84/12/27	85/01/25	(29)	0.0	----	37,440	0.0
85/01/25	85/03/05	(39)	0.0	----	36,880	0.0
					800,000	

ELECTRICITY LISTING OF INVOICES

Printed: 03/14/85

PROJECT: 85995 BURGER JUNCTION

INVOICES FROM (YYMMDD)	/ TO (YYMMDD)	(DAYS)	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %
82/11/24	82/12/28	(34)	0.0	-----	46,960	0.0
82/12/28	83/01/31	(34)	0.0	-----	50,160	0.0
83/01/31	83/02/22	(23)	0.0	-----	32,560	0.0
83/02/22	83/03/24	(30)	0.0	-----	34,160	0.0
83/03/25	83/04/26	(32)	0.0	-----	29,120	0.0
83/04/26	83/05/27	(31)	0.0	-----	21,440	0.0
83/05/27	83/06/23	(27)	0.0	-----	19,040	0.0
83/06/23	83/07/26	(33)	0.0	-----	22,080	0.0
83/07/26	83/08/24	(29)	0.0	-----	21,920	0.0
83/08/24	83/09/27	(34)	0.0	-----	23,440	0.0
83/09/27	83/10/25	(28)	0.0	-----	21,200	0.0
83/10/25	83/11/22	(31)	0.0	-----	35,760	0.0
83/11/22	83/12/30	(38)	0.0	-----	45,920	0.0
83/12/30	84/01/27	(28)	0.0	-----	41,840	0.0
84/01/27	84/02/27	(31)	0.0	-----	43,280	0.0
84/02/27	84/03/28	(30)	0.0	-----	42,000	0.0
84/03/28	84/04/26	(29)	0.0	-----	28,480	0.0
84/04/26	84/05/25	(29)	0.0	-----	22,800	0.0
84/05/25	84/06/27	(33)	0.0	-----	26,400	0.0
84/06/27	84/07/26	(29)	0.0	-----	22,400	0.0
84/07/26	84/09/07	(43)	0.0	-----	27,200	0.0
84/09/07	84/09/26	(19)	0.0	-----	19,840	0.0
84/09/26	84/10/30	(34)	0.0	-----	28,480	0.0
84/10/30	84/11/28	(29)	0.0	-----	32,160	0.0
84/11/28	84/12/27	(29)	0.0	-----	37,040	0.0
84/12/27	85/01/25	(29)	0.0	-----	37,440	0.0
85/01/25	85/03/04	(39)	0.0	-----	36,880	0.0
					850,000	

MONTHLY ELECTRICITY CONSUMPTION Printed: 03/04/85

PROJECT :85995 BURGER JUNCTION

YEAR: 1982

MONTH	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %	HEATING D-DAYS (18 C)	COOLING D-DAYS (13 C)
JANUARY	.0	----	0	0.0	966.0	0.0
FEBRUARY	.0	----	0	0.0	777.0	0.0
MARCH	.0	----	0	0.0	653.0	0.0
APRIL	.0	----	0	0.0	437.0	0.0
MAY	.0	----	0	0.0	228.0	0.0
JUNE	.0	----	0	0.0	84.0	0.0
JULY	.0	----	0	0.0	24.0	0.0
AUGUST	.0	----	0	0.0	73.0	0.0
SEPTEMBER	.0	----	0	0.0	126.0	0.0
OCTOBER	.0	----	0	0.0	403.0	0.0
NOVEMBER	.0	----	8,287	0.0	464.0	0.0
DECEMBER	.0	----	43,099	0.0	659.0	0.0
			51,386		4894.0	0.0

MONTHLY ELECTRICITY CONSUMPTION Printed: 03/04/85

PROJECT :85995 BURGER JUNCTION

YEAR: 1983

MONTH	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %	HEATING D-DAYS (18 C)	COOLING D-DAYS (13 C)
JANUARY	.0	----	43,734	0.0	784.0	0.0
FEBRUARY	.0	----	38,235	0.0	707.0	0.0
MARCH	.0	----	33,928	0.0	572.0	0.0
APRIL	.0	----	26,476	0.0	373.0	0.0
MAY	.0	----	21,494	0.0	236.0	0.0
JUNE	.0	----	20,903	0.0	61.0	0.0
JULY	.0	----	21,176	0.0	16.0	0.0
AUGUST	.0	----	22,967	0.0	34.7	0.0
SEPTEMBER	.0	----	20,885	0.0	112.0	0.0
OCTOBER	.0	----	25,849	0.0	321.9	0.0
NOVEMBER	.0	----	33,398	0.0	472.0	0.0
DECEMBER	.0	----	40,854	0.0	759.8	0.0
			353,869		4449.4	0.0

MONTHLY ELECTRICITY CONSUMPTION Printed: 03/14/85

PROJECT :85795 BURGER JUNCTION

YEAR: 1984

MONTH	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %	HEATING D-DAYS (18 C)	COOLING D-DAYS (18 C)
JANUARY	.0	-----	45,931	0.0	874.8	0.0
FEBRUARY	.0	-----	40,495	0.0	618.7	0.0
MARCH	.0	-----	42,146	0.0	717.1	0.0
APRIL	.0	-----	28,679	0.0	417.8	0.0
MAY	.0	-----	24,438	0.0	222.2	0.0
JUNE	.0	-----	23,517	0.0	89.2	0.0
JULY	.0	-----	23,243	0.0	3.1	0.0
AUGUST	.0	-----	19,411	0.0	14.0	0.0
SEPTEMBER	.0	-----	27,419	0.0	172.2	0.0
OCTOBER	.0	-----	26,238	0.0	323.5	0.0
NOVEMBER	.0	-----	33,604	0.0	463.8	0.0
DECEMBER	.0	-----	39,650	0.0	0.0	0.0
			375,592		3941.4	0.0

MONTHLY ELECTRICITY CONSUMPTION Printed: 03/14/85

PROJECT :35995 BURGER JUNCTION

YEAR: 1985

MONTH	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %	HEATING D-DAYS (18 C)	COOLING D-DAYS (13 C)
JANUARY	.0	----	37,950	0.0	938.1	0.0
FEBRUARY	.0	----	26,477	0.0	684.3	0.0
MARCH	.0	----	4,778	0.0	0.0	0.0
APRIL	.0	----	0	0.0	0.0	0.0
MAY	.0	----	0	0.0	0.0	0.0
JUNE	.0	----	0	0.0	0.0	0.0
JULY	.0	----	0	0.0	0.0	0.0
AUGUST	.0	----	0	0.0	0.0	0.0
SEPTEMBER	.0	----	0	0.0	0.0	0.0
OCTOBER	.0	----	0	0.0	0.0	0.0
NOVEMBER	.0	----	0	0.0	0.0	0.0
DECEMBER	.0	----	0	0.0	0.0	0.0
			69,154		1622.4	0.0

ELECTRICITY LISTING OF INVOICES

Printed: 02/28/85

PROJECT: 85494 CHINA HOUSE

INVOICES FROM (YYMMDD)	/ TO (YYMMDD)	(DAYS)	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %
82/12/13	83/01/13	(31)	42.0	-----	14,880	47.6
83/01/13	83/02/14	(32)	38.4	-----	13,260	45.0
83/02/14	83/03/16	(30)	42.0	-----	13,560	44.8
83/03/16	83/04/18	(33)	50.4	-----	12,780	32.0
83/04/18	83/05/16	(28)	52.8	-----	11,940	33.7
83/05/16	83/06/15	(30)	54.0	-----	16,560	42.6
83/06/15	83/07/14	(29)	54.0	-----	16,440	43.7
83/07/14	83/08/16	(33)	52.8	-----	18,360	43.9
83/08/16	83/09/14	(29)	50.4	-----	15,120	43.1
83/09/14	83/10/14	(30)	49.2	-----	14,520	41.0
83/10/14	83/11/15	(32)	45.6	-----	16,920	48.3
83/11/15	83/12/13	(28)	40.2	-----	11,640	43.1
83/12/13	84/01/12	(30)	42.6	-----	13,200	43.0
84/01/12	84/02/15	(34)	40.8	-----	14,460	43.4
84/02/15	84/03/15	(29)	39.6	-----	13,620	49.4
84/03/15	84/04/13	(29)	39.6	-----	13,080	47.5
84/04/13	84/05/15	(32)	53.2	-----	13,480	36.5
84/05/15	84/06/13	(29)	54.0	-----	13,620	36.2
84/06/13	84/07/13	(30)	52.8	-----	13,840	41.7
84/07/13	84/08/14	(32)	52.8	-----	18,660	46.0
84/08/14	84/09/14	(31)	51.6	-----	16,080	41.9
84/09/14	84/10/12	(28)	49.2	-----	12,720	38.9
84/10/12	84/11/13	(34)	52.2	-----	13,480	26.3
84/11/13	84/12/11	(26)	40.8	-----	12,180	47.8
84/12/11	85/01/13	(33)	43.2	-----	16,440	45.3
					366,840	

OIL 2 LISTING OF INVOICES Printed: 02/28/85

PROJECT: 85994 CHINA HOUSE

DELIVERY DATE (YYMMDD)	LITRES	GALLONS
83/01/05	1,063	234
83/01/18	930	205
83/02/07	1,752	385
83/02/24	1,426	314
83/03/18	1,295	285
83/04/12	1,406	309
83/10/12	408	90
83/11/28	2,035	448
83/12/23	1,892	416
84/01/16	1,923	423
84/02/01	1,592	350
84/02/22	1,449	319
84/03/30	1,804	397
84/04/10	1,341	295
84/05/22	1,029	226
84/09/27	54	12
84/11/23	1,530	337
84/12/21	1,720	378
	24,649	5,422

MONTHLY ELECTRICITY CONSUMPTION Printed: 03/04/85

PROJECT :85994 CHINA HOUSE

YEAR: 1982

MONTH	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %	HEATING D-DAYS (18 C)	COOLING D-DAYS (13 C)
JANUARY	.0	----	0	0.0	966.0	0.0
FEBRUARY	.0	----	0	0.0	777.0	0.0
MARCH	.0	----	0	0.0	653.0	0.0
APRIL	.0	----	0	0.0	437.0	0.0
MAY	.0	----	0	0.0	223.0	0.0
JUNE	.0	----	0	0.0	84.0	0.0
JULY	.0	----	0	0.0	24.0	0.0
AUGUST	.0	----	0	0.0	73.0	0.0
SEPTEMBER	.0	----	0	0.0	126.0	0.0
OCTOBER	.0	----	0	0.0	403.0	0.0
NOVEMBER	.0	----	0	0.0	464.0	0.0
DECEMBER	42.0	----	8,640	28.0	659.0	0.0
			8,640		4894.0	0.0

MONTHLY ELECTRICITY CONSUMPTION

Printed: 05/04/85

PROJECT :99994 CHINA HOUSE

YEAR: 1983

MONTH	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %	HEATING D-DAYS (18 C)	COOLING D-DAYS (13 C)
JANUARY	38.4	----	13,699	48.0	784.0	0.0
FEBRUARY	38.4	----	12,130	47.0	707.0	0.0
MARCH	47.0	----	13,042	42.0	572.0	0.0
APRIL	50.4	----	12,086	33.0	373.0	0.0
MAY	50.8	----	13,102	38.0	236.0	0.0
JUNE	54.0	----	16,784	43.0	61.0	0.0
JULY	52.8	----	17,395	44.0	16.0	0.0
AUGUST	52.8	----	16,723	43.0	34.7	0.0
SEPTEMBER	49.2	----	15,044	42.0	112.0	0.0
OCTOBER	45.6	----	15,766	46.0	321.9	0.0
NOVEMBER	45.6	----	14,168	43.0	472.0	0.0
DECEMBER	42.6	----	13,304	42.0	759.8	0.0
			175,264		4449.4	0.0

MONTHLY ELECTRICITY CONSUMPTION Printed: 03/04/85

PROJECT :85994 CHINA HOUSE

YEAR: 1984

MONTH	DEMAND kW	POWER FACTOR %	CONSUMPTION kWh	LOAD FACTOR %	HEATING D-DAYS (18 C)	COOLING D-DAYS (13 C)
JANUARY	40.8	----	13,361	44.0	894.8	0.0
FEBRUARY	40.8	----	12,955	46.0	618.7	0.0
MARCH	39.4	----	14,262	48.0	717.1	0.0
APRIL	55.2	----	14,088	35.0	417.8	0.0
MAY	51.2	----	14,772	36.0	222.2	0.0
JUNE	52.8	----	15,082	40.0	89.2	0.0
JULY	52.8	----	17,360	44.0	8.1	0.0
AUGUST	51.6	----	16,981	44.0	14.0	0.0
SEPTEMBER	49.2	----	14,531	41.0	172.2	0.0
OCTOBER	52.2	----	14,102	36.0	327.5	0.0
NOVEMBER	52.2	----	13,857	37.0	463.8	0.0
DECEMBER	43.2	----	14,548	45.0	675	0.0
			175,898		4616.4	0.0

MONTHLY OIL 2 CONSUMPTION Printed: 03/04/85

PROJECT :85294 CHINA HOUSE

YEAR: 198[illegible]

MONTH	+------- COMSUMPTION ACCORDING TO MONTHLY PROFILE ---------+ LITRES	GALLONS	HEATING D-DAYS (18 C)	COOLING D-DAYS (13 C)
JANUARY	3,132	689	784.0	0.0
FEBRUARY	2,276	500	707.0	0.0
MARCH	1,791	394	572.0	0.0
APRIL	715	157	373.0	0.0
MAY	69	15	236.0	0.0
JUNE	67	15	61.0	0.0
JULY	69	15	16.0	0.0
AUGUST	69	15	34.7	0.0
SEPTEMBER	67	15	112.0	0.0
OCTOBER	849	187	321.9	0.0
NOVEMBER	1,364	300	472.0	0.0
DECEMBER	2,356	518	759.8	0.0
TOTAL [illegible]	12,623	2,820	4449.4	0.0

MONTHLY OIL 2 CONSUMPTION Printed: 03/04/85

PROJECT :85/294 CHINA HOUSE

YEAR: 1984

	+------ COMSUMPTION ACCORDING TO MONTHLY PROFILE		HEATING D-DAYS (18 C)	COOLING D-DAYS (13 C)
MONTH	LITRES	GALLONS		
JANUARY	2,723	599	894.8	0.0
FEBRUARY	2,123	467	618.7	0.0
MARCH	2,055	452	717.1	0.0
APRIL	1,006	221	417.8	0.0
MAY	543	119	222.2	0.0
JUNE	13	3	89.2	0.0
JULY	13	3	8.1	0.0
AUGUST	13	3	14.0	0.0
SEPTEMBER	92	20	172.2	0.0
OCTOBER	832	183	323.5	0.0
NOVEMBER	1,047	230	463.8	0.0
DECEMBER	1,290	284	675	0.0
TOTAL 84	11,750	2,584	4616.4	0.0

APPENDIX G

INFORMATION TRANSFER

INFORMATION TRANSFER

During the demonstration period, three seminars were held which included the demonstration of the Econovent retrofit at China House in Fredericton.

1. **ENERGY CONSERVATION IS GOOD BUSINESS**

   - 19 business people involved as retailers and real estate agents in the province of New Brunswick attended this seminar on October 25, 1983.

2. **SECONDARY SCHOOL TEACHERS OF NEW BRUNSWICK**

   - 40 teachers were explained and demonstrated the new technology for energy conservation on August 24, 1984.

3. **ENERGY, MINES AND RESOURCES STAFF**

   - Staff from Ottawa and the Province of New Brunswick took advantage of an opportunity to view the demonstration during lunch at China House on June 28, 1984.

POOR
QUALITY
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